

Vegetable Product Series, No. 35.)
(Timbers.)

THE
AGRICULTURAL LEDGER.

1897—No. 9.

LAGERSTRÆMIA FLOS-REGINÆ.

(JARÚL.)

[*DICTIONARY OF ECONOMIC PRODUCTS, Vol. IV., L. 42-49.*]

A brief account of existing information amplified by details obtained through Officers of the Indian Forest Department, and a recent report by PROFESSOR W. G. UNWIN, F.R.S., on Mechanical Tests of the Timber at the Imperial Institute, London. The whole forming a Revision of the Dictionary Article on the subject.

Other DICTIONARY articles that may be consulted :

Lagerstrœmia hypoleuca,	Vol. IV., L. 50-51.
L. lanceolata,	„ L. 53-54.
L. parviflora,	„ L. 55-61.
L. tomentosa,	„ L. 62-64.



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The objects of THE AGRICULTURAL LEDGER are :—

- (1) To provide information connected with agriculture or with economic products in a form which will admit of its ready transfer to ledgers ;
- (2) To secure the maintenance of uniform ledgers (on the plan of the Dictionary) in all offices concerned in agricultural subjects throughout India, so that references to ledger entries made in any report or publication may be readily utilised in all offices where ledgers are kept ;
- (3) To admit of the circulation, in convenient form, of information on any subject connected with agriculture or economic products to officials or other persons interested therein ;
- (4) To secure a connection between all papers of interest published on subjects relating to economic products and the official Dictionary of Economic Products. With this object the information published in the ledgers will uniformly be given under the name and number of the Dictionary article which they more especially amplify. When the subject dealt with has not been taken up in the Dictionary, the position it very possibly would occupy in future issues of that work will be assigned to it.

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The following article on *Lagerstræmia Flos-reginæ* has been drawn up mainly from information received from the various Forest Officers of India, in reply to a series of questions issued by this office in the form of a Circular Note. This course was pursued in accordance with arrangements that had been made with the Inspector General of Forests for the investigation each year of two or three forest trees in the timbers of which it might be thought there was a possibility of the export trade being extended or established. The primary object of the enquiry was thus the trade in the timber of each species, but opportunity was taken to collect particulars as to the area of distribution of the tree, the nature of the forests in which it occurred, the conditions of soil and climate under which it luxuriated and the minor economic products which it afforded. Such an enquiry necessarily meant a complete revision and confirmation of the particulars already published in the *Dictionary of the Economic Products of India*, and it has accordingly been thought the more desirable course to throw the new information into the form of a revised version of the Dictionary article.

The numbers shown on the margin are the registration numbers assigned to the specimens collected as the result of this enquiry.

L. 42-49.

LAGERSTRÆMIA
Flos-reginæ.

A Revision of the Dictionary

LAGERSTRÆMIA, Linn.; Gen. Pl., I., 783.

A genus of trees or shrubs which belongs to the Natural Order LYTHRACEÆ. It comprises 18 species, natives of South-East Asia, extending to Australia. Burma is the centre of the genus. All the species are highly ornamental, and may be either propagated in garden soil by seed, or by cuttings.

Lagerstrœmia Flos-reginæ, Retz.; Fl. Br. Ind., II., 577;

Wight, Ic., t. 413; Index Kewensis, Pl. III., 23; LYTHRACEÆ.

Syn.—*ADAMBEA GLABRA, Lamk.; L. AUGUSTA, Wall.; L. MACROCARPA, Wall.; L. MAJOR, Retz.; L. MINOR, Retz.; L. MUNCHAUSIA, Willd.; L. PLICIFOLIA, Stokes; L. REGINÆ, Roxb.; L. SPECIOSA, Pers.; MUNCHAUSIA SPECIOSA, Linn.*

Vern.—*Arjuna, jarul, HIND.; Jarul, BENG.; Gara saikre, KOL.; Sekra, SANTAL; Ajhar, jarul, ASSAM; Boloshari, jalai, GARO; Taman, tamana bondara, BOMB.; Bondara, mota-bondara, KONKAN; Taman, tamana, mota-bondara, tamhena, MAR.; Kadali, TAM.; Chennangi, TEL.; Challâ, holedasâl, holedasâl, holehonogalu, holemahli, hole pavase, maruwa, KAN.; Adamba, MALAY.; Eikhmwâ, konepyinna, lêza, lêzani, pyinna, yengma, BURM.; Kamaung, MAGH.; Murule, murutagass, SING.; Arjuna, SANS.*

References.—*Roxb., Fl. Ind., Ed. C.B.C., 404; Brandis, For. Fl., 240; Kurs, For. Fl. Burm., I., 524; Beddome, Fl. Sylv., t. 29; Gamble, Man. Timb., 202, 203; Dals. & Gibs, Bomb. Fl., 98; Mason, Burma and Its People, 406, 537, 538, 758; Sir W. Elliot, Fl. Andh., 36; Works of Sir W. Jones, V., 147; Smith, Dic., 55; Lisboa, U. Pl. Bomb., 80; Birdwood, Bomb. Prod., 330; Talbot, List of Trees, Shrubs and Climbers, Bomb., 99; Forest Trees, Mysore and Coorg, 3rd ed. by John Cameron, 149, 150; Kew Reports, 69; Suggestions re Forest Adm., Madras, 1883, 62; Working Plans, Central Colaba, Bomb., 1894 and 1895, 209; Note on Inspection of Forests, Assam, 1889, 14, 25; Working Plans, Goalpara Sâl Forests, Assam, 1894, 5; Suggestions re Forest Adm., Br. Burma, 1881, 9, 56; Working Plan for Kabaung Reserve, Toungoo Dn., 1894, 3; Gazetteers:—Bombay, X., 37, 404; XI., 26; XIII., 24; XV., 37, 70; Burma, 1879-80, I., 83, 85, 87, 109, 118, 125, 135; II., 5, 6, 129, 136, 164, 168, 186, 201, 213, 223, 257, 268, 270, 275, 300, 325, 437, 441, 534, 612, 650, 686, 706, 788, 816, 817, 854; Mysore and Coorg, I., 47, 61; Imperial Gazetteer, I., 349; Agri-Horti-Soc. of Ind., Journal (Old Series), IV., 128, 134, 208, VI., 41; VIII., Sel., 177; IX., 252, 423; XI., 446; XIII., 336; Indian Forester, I., 112, 363; II., 19; III., 23; IV., 47, 101; V., 190, 497; VII., 42, 196; VIII., 381; 402, 414; IX., 358; X., 33, 134, 532; XI., 258, 288, 320, 321, 374, 375; XIII., 127, 376, 553; XIV., 119, 339; Letters, No. B. 694, dated 25th March 1896, from Asst. Conserv., Forests, Sib-sagar Div.; No. B. 55, dated 7th May 1896, from Offg. Dy. Conserv., Forests, Garo Hills Div.; No. B. 211, dated 15th July 1896, from Dy. Conserv., Forests, Cachar Div.; No. T. E. 245, dated 27th November 1896, from Conserv., Forests, Assam; No. B. 62, dated 17th January 1897, from Asst. Conserv., Forests, Sib-sagar Div.; No. 2504, dated 23rd March 1896, from Dir. Forest Officer, N. D. Kanara; No. 155, dated 14th and 15th*

Article on the subject. (W. R. Yates.)

**LAGERSTRÆMIA
Flos-reginæ.**

April 1896, from Dist. Forest Officer, Poona; No. G. 154, dated 25th June 1896, from Divl. Forest Officer, Kolaba; No. G. 340, dated 2nd September 1896, from Divl. Forest Officer, Kolaba; No. 84—21 G. R., dated 14th March 1896, from Dy. Conserv., Forests, Katha Div., Burma; No. 831—36 A.—2, dated 11th July 1896, from Conserv., Forests, E. Circle, Burma; No. 149 J.—6, dated 14th August 1896, from Dy. Conserv., Forests, Prome Div.; No. 2893—54-2, dated 26th January 1897, from Conserv., Forests, Pegu Circle, Burma; No. 378 For., dated 21st September 1896, from Dist. Forest Officer, S. Canara; Imp. Inst. Journal, 11, 1896, p. 444; Progress Report of Forest Administration of Assam, 1895-96, p. 14.

Habitat.—A large deciduous tree often attaining a height of 150 feet with a girth of 6 to 12 feet and a bole extending from 15 to 40 feet. It is found in abundance in Assam and Burma, and less plentifully in the Bombay and Madras Presidencies. Cultivated throughout India as an avenue tree.

Cultivation.—The tree is reported by all the Forest Officers as growing wild, no special care being taken to propagate it. The following information has been collected regarding its reproduction:—"Natural reproduction is not good as the tree grows on low and swampy ground with a dense undergrowth which precludes all possibility of seed germinating" (*Lakhimpur*); "It grows wild, no special care being taken to propagate it, as it reproduces itself (on low land) most luxuriantly every year, seeding most abundantly" (*Sibsagar*); "It is never cultivated but reproduces itself naturally from seed" (*Prome*). It is reported from Burma, Katha Division, as being associated with teak. In the *Progress Report of Forest Administration in Assam, 1895-96, p. 14*, it is referred to as follows:—"Under cultural operations the additions shown are 79 acres of *jarul* (*Lagerstræmia Flos-reginæ*) in the Langai and Singla reserve, Sylhet Division, which includes 6 acres of the year and 73 acres previously established and 7 acres of established *jarul* sown on *jhams* in the Bagmara reserve, Garo Hills Division." Period of sowing seeds early in May (*Garo Hills*).

Soil.—It is reported as being "a very accommodating tree as regards soil requirements, stiff clays and rich deep loams seem both to suit it" (*Sibsagar*). By the majority of the correspondents the tree has been observed to flourish on flat and low-lying swampy ground, in places where vegetation is abundant and atmospheric conditions moist, and on the banks of streams. The Forest Officer of *Sibsagar* further writes as follows:—"It grows principally on low-lying swampy ground, inundation for a portion of the year appearing to be favourable to its growth. It, however, appears, though does not thrive on high ground or on *teelas* (low hills)." The Bassein Forest Officer says: "flourishes on rather high ground." The Forest Officer of the Katha Division, Burma, reports it as flourishing in well-drained localities. It is fit to be felled at 30-50 years of age.

Peculiarity regarding Growth.—It very rarely has a clean, straight bole to any great height, its branches almost invariably, having a

Seeds.
Reg. No.
8533.

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Flos-reginæ.

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Flowers.
Reg. No.
8005.
8523.
8531.
9303.

Fruits.
Reg. No.
8521.
8532.
8708.
9145.
9302.

Fibre.
Reg. No.
8178.

Roots.
Reg. No.
8002.
8007.
8520.
8528.
8661.
8701.
9148.
9301.

Bark.
Reg. No.
8003.
8008.
8179.
8519.
8529.
8660.
8703.
9147.
9300.

Leaves.
Reg. No.
8004.
8009.
8180.
8522.
8530.
8662.
8702.
9148.
9304.

Timber
(Cachar).
Reg. No.
8046.

tendency to a low downward growth. Both the stem and branches are as a rule much knotted and twisted.

Flowers.—It bears large purple or mauve-coloured flowers which are discernable from a great distance. During the period of flowering the country side is a mass of purple or mauve colour, due to the frequent occurrence of the tree. The flowers appear between March and July. On account of its ornamental appearance it is cultivated all over the hotter parts of India, as far north even as Lahore.

Fruits.—The fruits ripen in July and August. The Forest Officer, Promé, states that the fruits in his district ripen in December. "The seeds form in August and September, and do not fall till the following May" (*Sibsagar Forest Officer*).

Leaves.—"Appear in May and fall off in February and March" (*Sibsagar*).

Resin.—"Exudes a resin" (*Kurz*). All the information that has been received from the Forest Officers on this point can be summed up in these few words: "Not collected nor used." Only two officers, those of *Sibsagar* and *South Canara*, assert that the tree does not exude any resin. The point is still therefore doubtful whether or not it affords a gum.

Fibre.—The Forest Officer of *Kheri, Oudh*, supplied a sample of the fibre. Specimens were not furnished from any other source and the fact that *Lagerstroemia Flos-reginæ* yielded a fibre appears to have hitherto escaped notice. There is no record of the fibre being put to any use.

Medicine.—The root is prescribed as an astringent. "Its root, BARK, LEAVES and FLOWERS are used medicinally by natives" (*Beddome*). The Rev. J. Long in an article on the Indigenous Plants of Bengal, states that the seeds are narcotic, the bark and leaves purgative (*Jour. Agri.-Hort. Soc. of Ind. (Old Series), IX., 423*). Dr. Thomson reports, that the fruit of the *Pyenma* is used in the Andamans as a local application for aphthæ of the mouth (*Jour. Agri.-Hort. Soc. of Ind. (Old Series), XI., 446*). The Forest Officer of Promé, Burma, writes that the bark is pounded up and used by the Burmese medicine men in fever cases. The replies from the Forest Officers of Assam, Bengal, and Madras are to the effect that no parts of the tree are used as medicine.

SPECIAL OPINION.—§ "The bark of this and of *L. indica*, Linn., is considered stimulant and febrifuge" (*Surgeon-Major W. D. Stewart, Cutlack*).

Structure and Uses of the Wood (sometimes called *Indian Blood Wood*).—"Shining, light red, hard; annual rings marked by a belt of large pores, weight about 40lb per cubic foot. This is the most valuable timber of Sylhet, Cachar, and Chittagong, and in Burma the next in value after teak. It is used in ship-building, and for boats and canoes, all kinds of construction, timber and carts. The Ordnance Department use it for many parts of their gun-carriages. In South India it is used for building, and in Ceylon for casks" (*Gamble*). *Kurz* describes the wood as being pale or dark brown, rather heavy, streaked, fibrous but close grained, takes a fine polish. In

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Burma it is used for house posts, planking, beams, scantling for roofs, carts, boats, paddles, oars, etc. Beddome states that it is very durable under water, though it soon decays under ground, also that, in his time, it was employed at the Madras Gun-carriage manufactory for light and heavy checks, felloes, and cart naves, framing and boards of wagons, timbers, ammunition box boards, and platform carts.

At a conference held on timbers, at the Colonial and Indian Exhibition in 1886, it was recommended to carriage-makers in England, and the suggestion offered that it might be exported from Calcutta, Chittagong, Rangoon, and Madras. The chief supply comes from the forests of Assam and Cachar, and the timber would, therefore, be procurable most readily from Calcutta.

The opinions of the various Forest Officers prove it to be of excellent quality, hard, lasting well when subject to changes of moist to dry weather, very durable under water, able to stand rough wear, and thus very valuable. It is used for purposes of house and boat building, for bridges, carts, and in fact for every kind of work where hard, easily workable, and durable timber is needed. It is in considerable demand in Assam as keel pieces for boats that have to pass through salt water, as it is said to resist the action of salt water better than any other timber. At an enquiry as to the best substitute for Italian Walnut for use as rifle stocks it was recommended by the Inspector General of Forests as the best in his opinion for that purpose.

As somewhat opposed to the above statement of its merits the Forest Officer of South Canara reported as follows:—"The wood is soft and light; white in colour. Takes polish well and the timber is said to be free from shakes and cracks. It is, however, said to be so liable to attack by white-ants that it is not used for any building purposes nor in any shape whatever." The confliction of opinion may be due to the timber attaining a better quality in Assam than elsewhere.

A recent report on mechanical tests of this timber by Professor W. C. Unwin, F.R.S., at the Imperial Institute, London, may be here given:—

REPORT ON MECHANICAL TESTS OF AN INDIAN TIMBER.

(By Professor W. C. Unwin, F.R.S., etc.)

The plank dealt with, which was about 2½ inches thick and rather exceptionally dry (as the wetness test shows), is described as the timber of *Lagerstroemia-Flos-reginæ*, or *Pyinma*. The colour of this wood is brown or light walnut.

A block, weighing 599·3 grams, was tested for density. The specific gravity was 0·669 and the heaviness 41·77 lb per cubic foot.

Some shavings dried in an oven at about 180°F. for eleven hours showed the amount of moisture in the timber to be 13·77 per cent. reckoned on the weight of the dry wood.

SHEARING TEST.—Two tests were made: (a) with the shearing plane about parallel to the annual rings, (b) with the shearing plane about at right angles to the annual rings.

Timber
(Burma).
Reg. No.
8342.
Timber
(South India).
Reg. No.
8658.
8659.
9125.
9299.

Timber
(Assam).
Reg. No.
8593.
8594.

Timber
(South
Canara).
Reg. No.
9299.

LAGERSTRÆMIA
Flos-reginæ.

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(a) BLOCK 69c.

Dimensions, 1'935 × 2'036 inches.

Area sheared, 3'939 sq. inches.

Shearing load, 3,588lb.

Shearing stress 910·8lb per sq. inch = 0'407 tons per sq. inch.

(b) BLOCK 69d.

Dimensions, 1'985 × 1'980 inches.

Area sheared, 3'930 sq. inches.

Shearing load, 2,349lb.

Shearing stress, 597·7lb per sq. inch = 0'267 tons per sq. inch.

Mean shearing resistance, 754lb, or 0'337 ton per sq. inch.

TRANSVERSE TEST.—Two tests were made with rectangular bars on a span of 45 inches—

Bar 69a.—Width, 3'503 inches.

Bar 69b.—Width, 3'629 inches.

Depth, 2'592 "

Depth, 2'607 "

Load at Centre, in pounds.	Deflections, in inches.		Load at Centre, in pounds.	Deflections, in inches.	
	69a.	69b.		69a.	69b.
0 . . .	...	...	2,000 . . .	0'569	0'677
250 . . .	0'085	0'106	2,250 . . .	...	0'736
500 . . .	0'170	0'212	2,500 . . .	0'927	0'787
750 . . .	...	0'286	3,000 . . .	...	1'036
1,000 . . .	0'362	0'363	3,500 . . .	...	1'256
1,250 . . .	...	0'451	3,900 . . .	Broke.	...
1,500 . . .	0'520	0'526	4,000 . . .	...	1'466
1,750 . . .	...	0'572	4,393 . . .	...	Broke.

Both bars broke by tension.

The following are the results reduced :—

Bar.	Co-efficient of transverse strength.		Range of stress, in pounds.	Co-efficient of Elasticity.	
	Pounds.	Tons.		Lb. per sq. in.	Tons per sq. in.
69a . . .	11,353	5'07	0 to 2,000	1,312,500	585'3
69b . . .	12,037	5'37	0 to 2,500	1,125,400	502'4
Mean . . .	11,696	5'22	...	1,218,950	544'1

COMPRESSION TEST.—Two tests were made :—

Block 69e.—Dimensions, 2'452 × 2'499 inches.

Height, 6'55 inches.

Area crushed, 6'128 sq. inches.

Crushing load, 16'91 tons.

Crushing stress, 2'759 tons per sq. inch.

Block 69f.—Dimensions, 2'418 × 2'490 inches.

Height, 6'50 inches.

Area crushed, 6'020 sq. inches.

Crushing load, 16'68 tons.

Crushing stress, 2'765 tons per sq. inch.

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Both specimens broke fairly by shearing. The mean crushing resistance is 2.762 tons per sq. inch.

Considering that the wood is not very heavy, its strength is good.

Domestic and Sacred Uses.—Leaves used as manure which is very much appreciated (*South Kanara Report*).

Trade.—There appears to be no trade in this timber in any of the provinces of India, except Assam. The Forest Officers of the latter province write as follows:—"All timber removed is exported to Bengal. The price of a standing tree is Rs. 6." (*Garó Hills*). "Trade exists, about 20,000 cubic feet in logs being yearly exported to various places in the Sylhet District. Selling price varies from Rs. 1 to Rs. 2 per cubic foot" (*Cachar*); "from this district no export due to distance from large markets of Bengal and consequent heavy cost of carriage. The timber is used to a small extent locally, but there is no regular trade. Planks of this timber 15' x 1" x 18" sell for Rs. 1-4 to Rs. 1-8 each" (*Lakkimpur*); there is little or no export trade—except perhaps in the form of boats (dug-outs) which are used on the Brahmaputra" (*Sibsagar*).

Supply.—The Forest Officers of Assam report that the outturn cannot even be approximately estimated owing to the trees growing scattered over large areas. That no great quantities can be supplied is due to the fact that there is a considerable local demand for it. All mature timber found in accessible places is greedily acquired by the natives. But there is no doubt that large stores in inaccessible places, when the country is more opened out, will be readily obtained.

The Forest Officer of South Kanara writes as follows:—"Limited as the tree is to narrow belts on river banks and its absence in any large numbers on such situations, the supply is here very limited."

The Forest Officer of Prome, Burma, states that "if a demand arose probably 200 or 300 tons could be supplied at Rs. 18 to Rs. 20 per ton in the rough."

L. 42-49.

G. I. C. P. O.—No. 250 R. & A.—30-S-97, 2, 200.—W. B. G.

All communications regarding THE AGRICULTURAL LEDGER should be addressed to the Editor, Dr. George Watt, Reporter on Economic Products to the Government of India, Calcutta.

The objects of this publication (as already stated) are to gradually develop and perfect our knowledge of Indian Agricultural and Economic questions. Contributions or corrections and additions will therefore be most welcome.

In order to preserve a necessary relation to the various Departments of Government, contributions will be classified and numbered under certain series. Thus, for example, papers on Veterinary subjects will be registered under the Veterinary Series ; those on Forestry in the Forest Series. Papers of more direct Agricultural or Industrial interest will be grouped according as the products dealt with belong to the Vegetable or Animal Kingdom. In a like manner, contributions on Mineral and Metallic subjects will be registered under the Mineral Series.

This sheet and the title-page may be removed when the subject-matter is filed in its proper place, according to the letter and number shown at the bottom of each page.